

Lecture organised by RAeS  
Hamburg Branch  
Hamburg Aerospace Lecture  
Series  
(DGLR, RAeS, VDI, ZAL,  
HAW Hamburg)  
23.01.2020  
HAW Hamburg (Hamburg  
University of Applied  
Sciences)



## Airbus BelugaXL

Veronique Roca – Beluga XL Chief Engineer

**AIRBUS**

RAeS Hamburg in cooperation with the DGLR, VDI, ZAL & HAW invites you to a lecture

## Beluga XL - Oversize Transport for the 21st century

**Veronique Roca**, Airbus BelugaXL Technical Director & Chief Engineer, Airbus Operations

**Date: Thursday 23 January 2020, 18:00**

**Location: HAW Hamburg Berliner Tor 5, (Neubau), Hörsaal 01.11**

Lecture followed by discussion  
No registration required !  
Entry free !



Featuring one of the most voluminous cargo holds of any civil or military aircraft flying today, the Airbus Beluga plays a key role in keeping Airbus production and assembly network operating at full capacity. The current fleet of 5 Beluga, based on A300-600, carries complete sections of Airbus aircraft from different production sites around Europe to the final assembly lines in Toulouse, France and Hamburg, Germany.

To support the A350 XWB ramp-up and other production rate increases, Airbus will gradually replace its current Beluga's with six BelugaXL aircraft, derived from the company's versatile A330 widebody product line. Veronique Roca, Chief Engineer of the BelugaXL, will tell us about the BelugaXL since its launch in Nov 2014: with the First Flight in July 2018, the BelugaXL is now completing the Flight Test Campaign and has recently achieved certification.

*Veronique has been BelugaXL Technical Director & Chief Engineer since 2016. As part of her mission she holds the Technical Authority to define and validate the target configuration of the aircraft, in line with operational and certification requirements, and meeting highest safety standards. Previously, Veronique was A330 Chief Engineer for France for two years.*

DGLR / HAW Prof. Dr.-Ing. Dieter Scholz  
DGLR Dr.-Ing. Martin Spieck  
RAeS Richard Sanderson

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DGLR Bezirksgruppe Hamburg  
RAeS Hamburg Branch  
VDI, Arbeitskreis L&R Hamburg  
ZAL TechCenter

<http://hamburg.dglr.de>  
<http://www.raes-hamburg.de>  
<http://www.vdi.de/>  
<http://www.zal.aero/veranstaltungen>

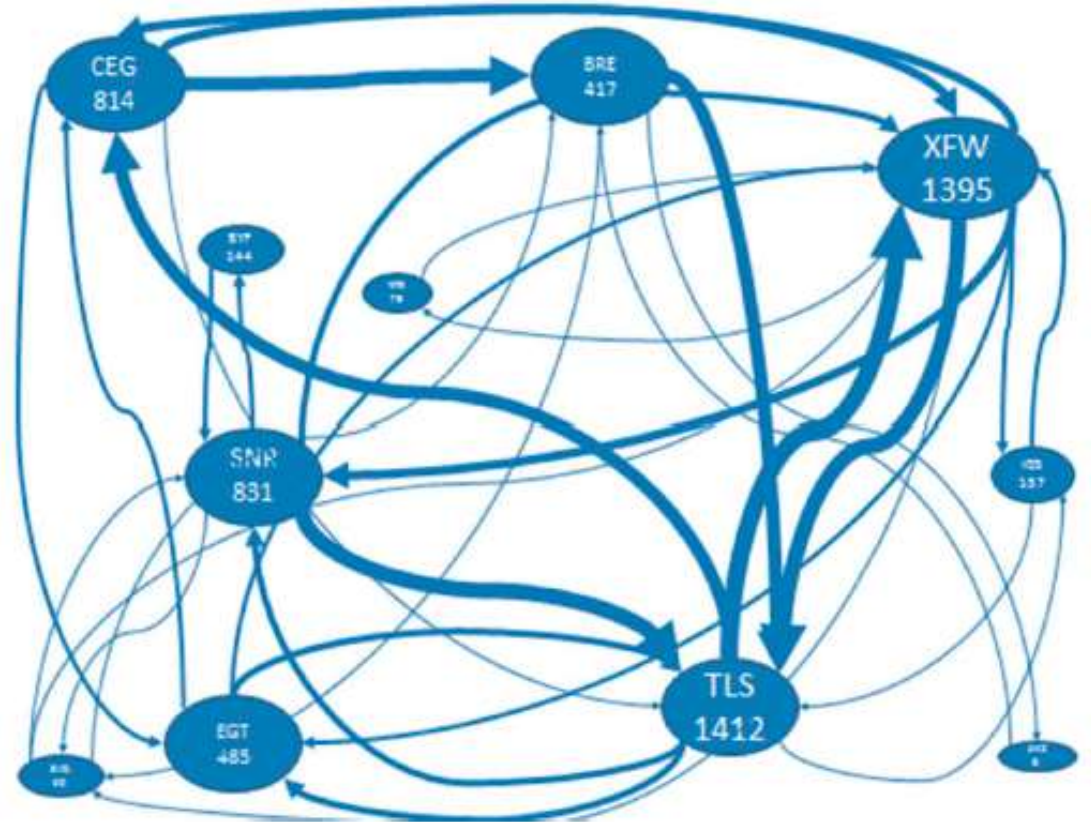


Hamburg Aerospace Lecture Series von DGLR, RAeS, ZAL, VDI und HAW Hamburg (PSL)  
<http://www.AeroLectures.de/>

# The Beluga's: a family portrait.



# Oversize Air Transport – End to End solution for Airbus production



5 flights/day/aircraft, 6 days /week

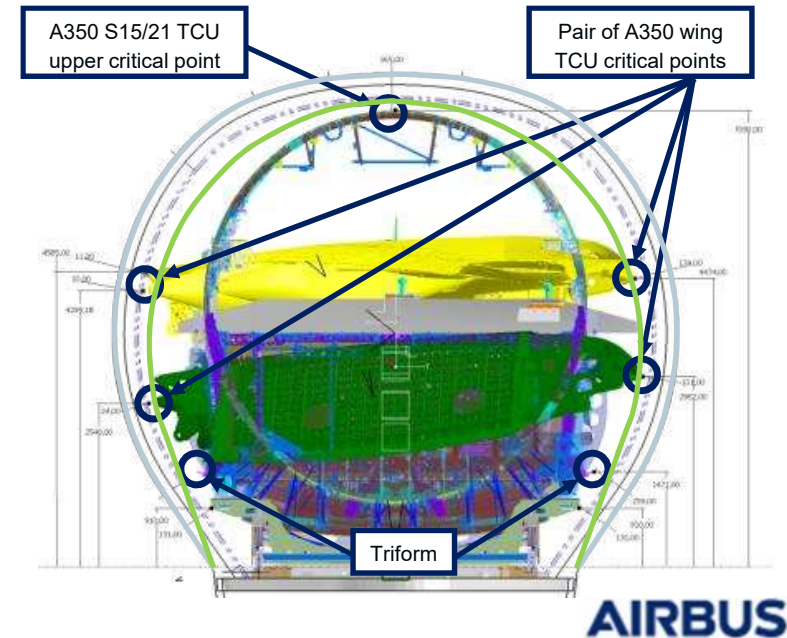
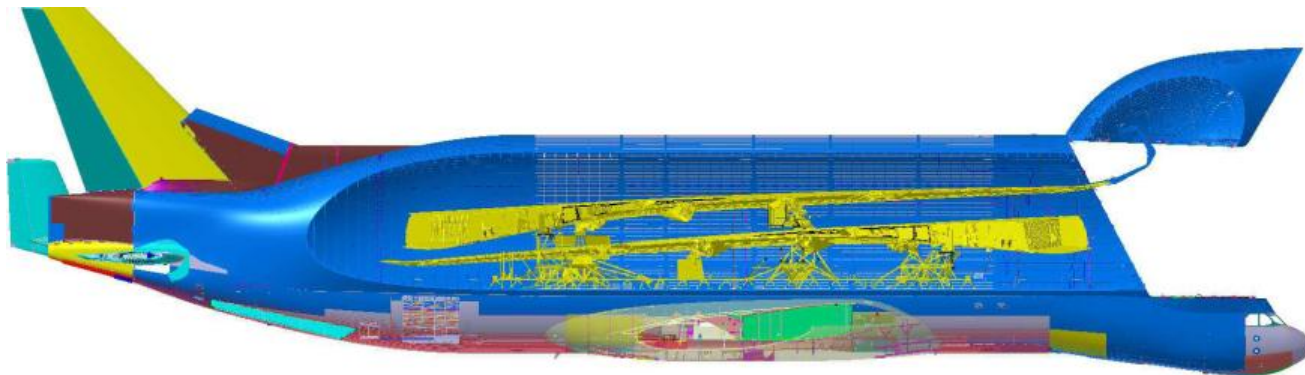
# Why a Beluga XL?

Today: 5 Beluga ST, operated at their maximum

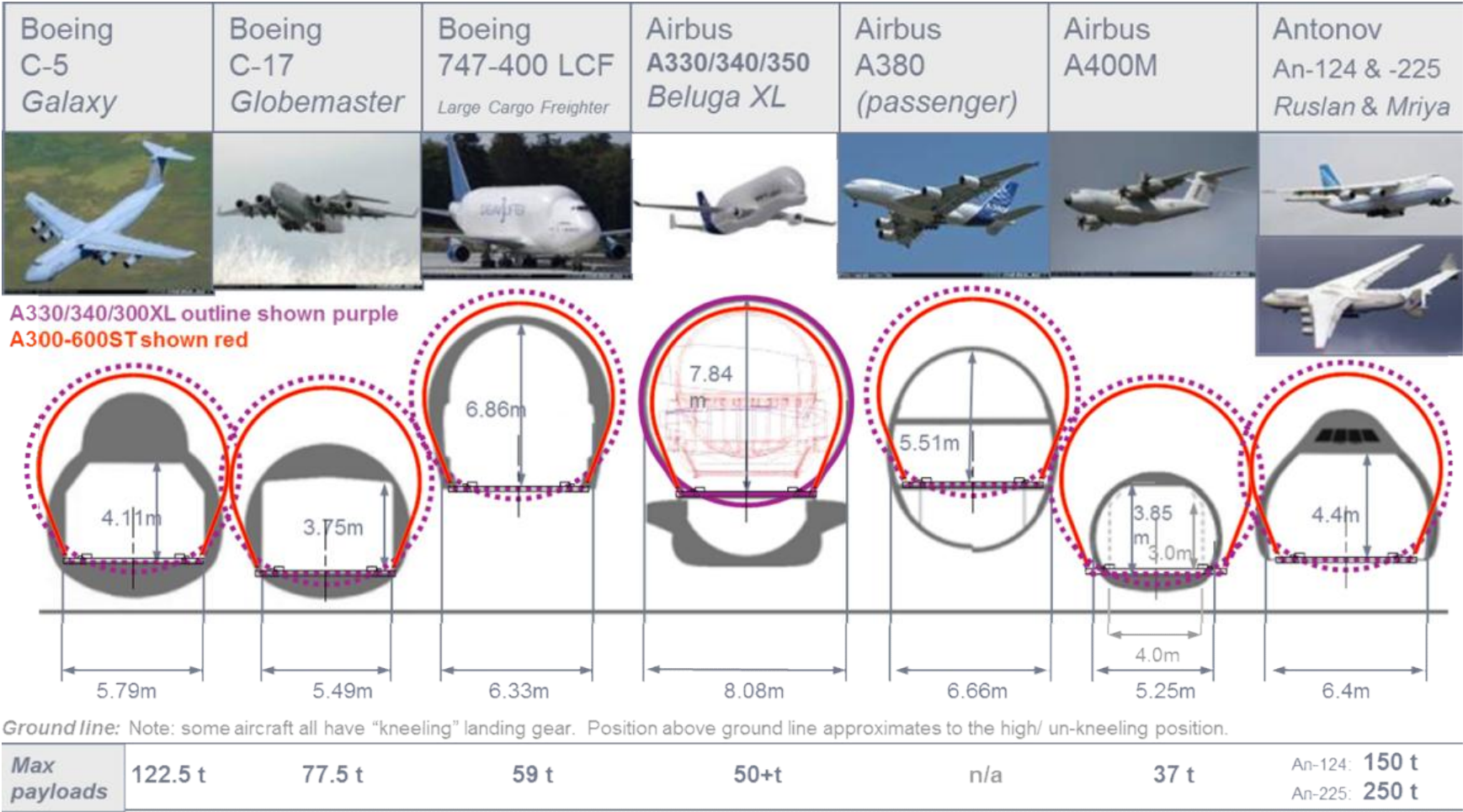
Increased production rates through time

Higher transport requirements: with A320 : ref, A330 : x3, A350 : x7

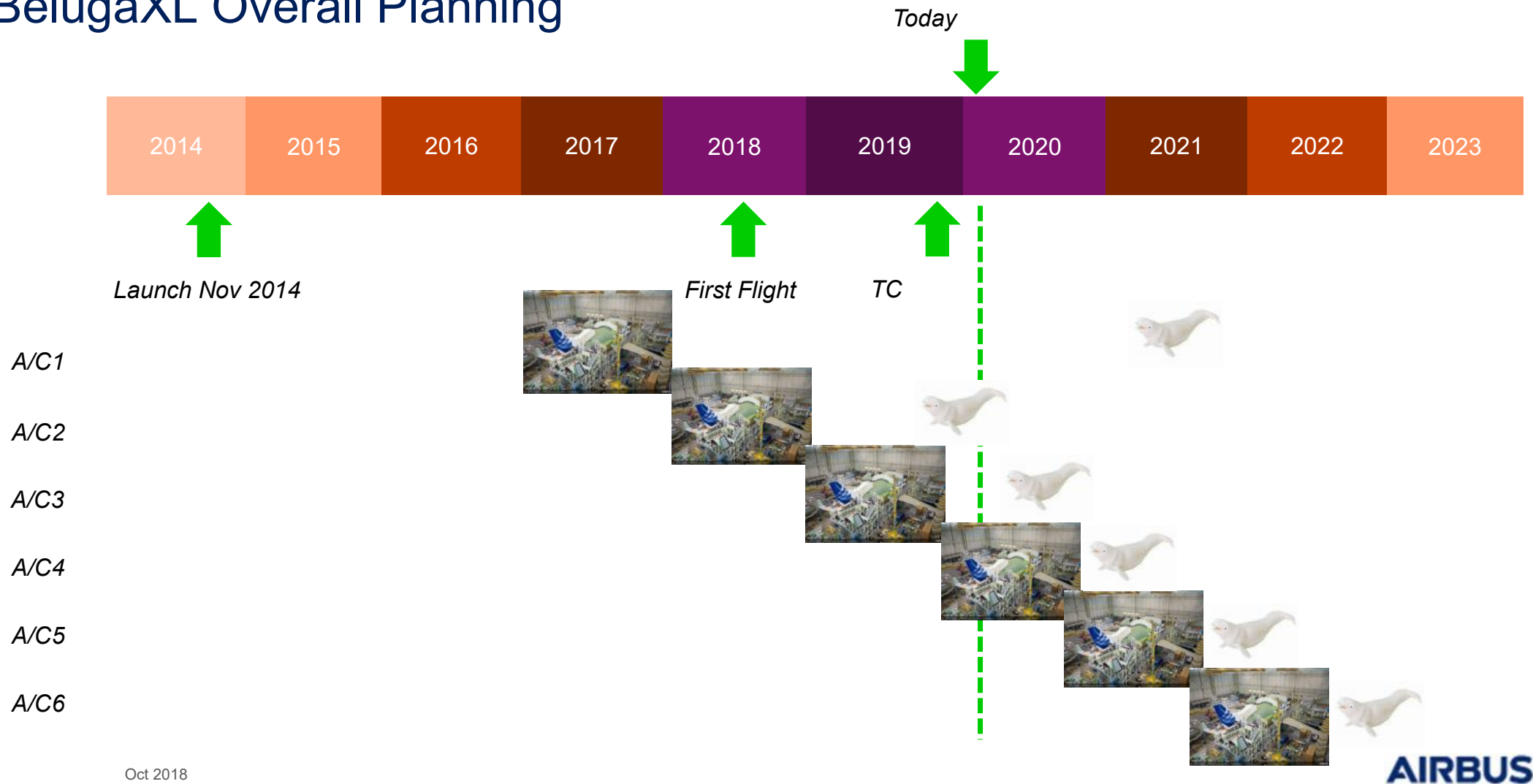
Road and sea transport less flexible



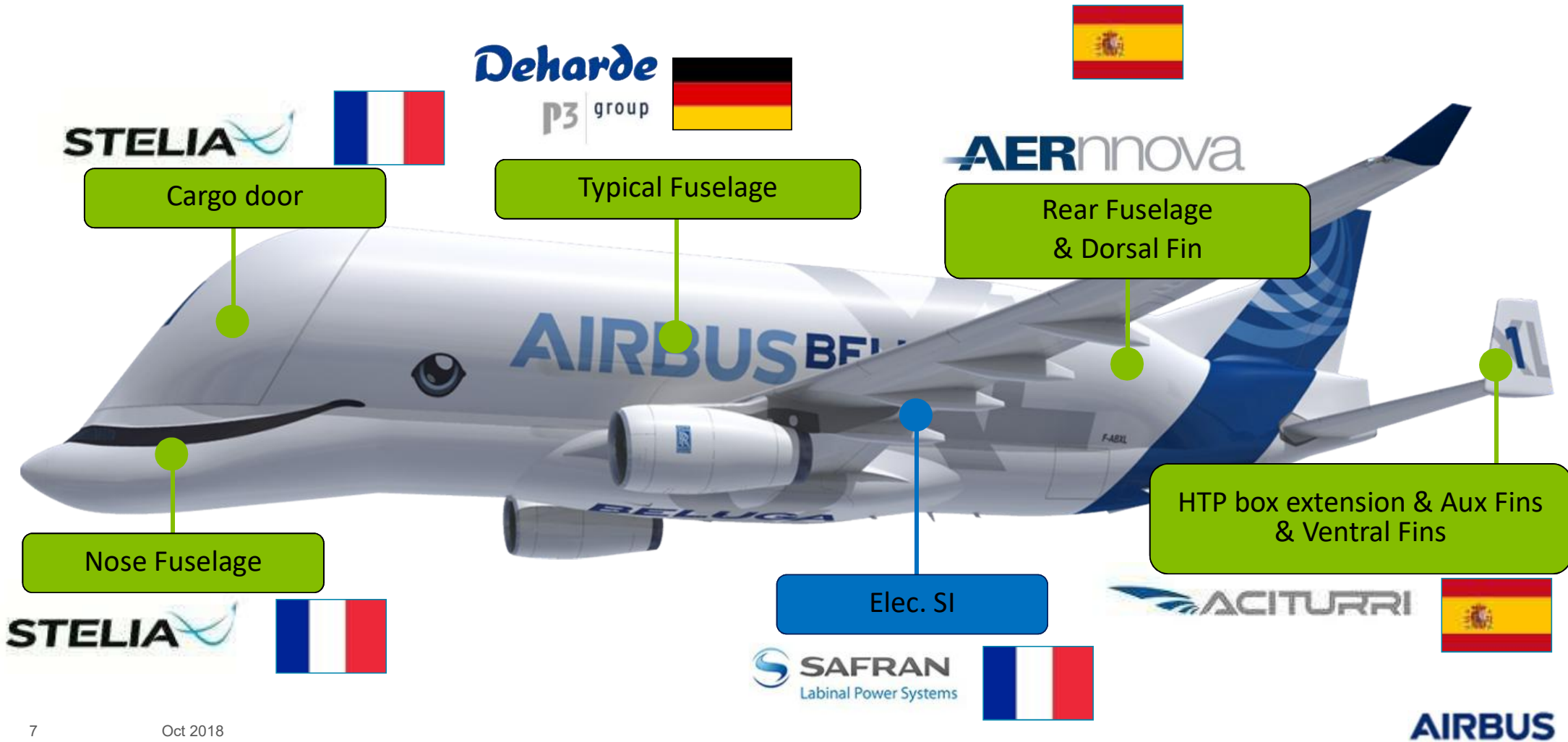
# Why a BelugaXL ?



# BelugaXL Overall Planning



# A Team work - Major Structure & SI Suppliers

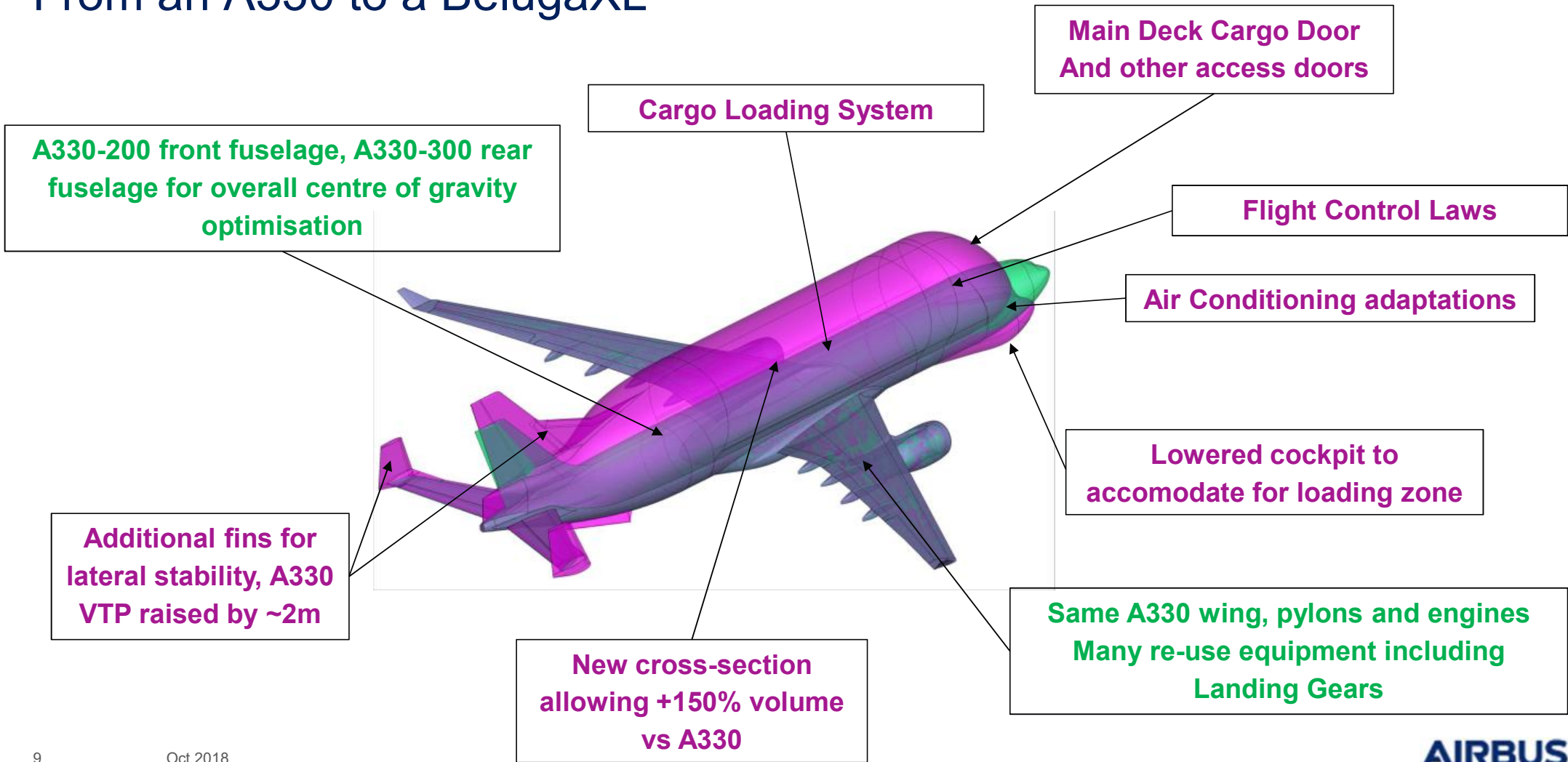




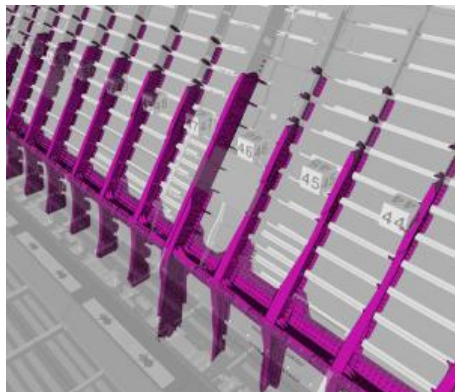
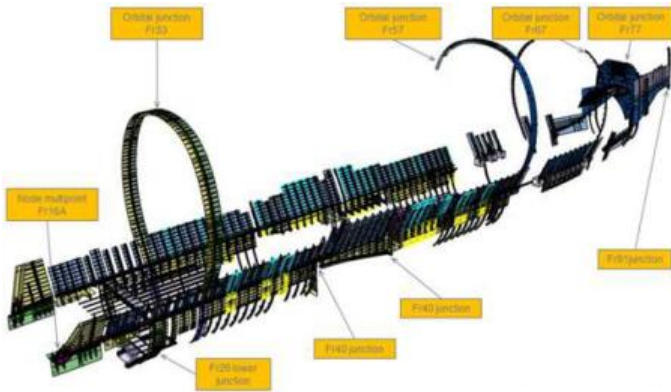
# A Team work - Major Equipment / Systems Suppliers



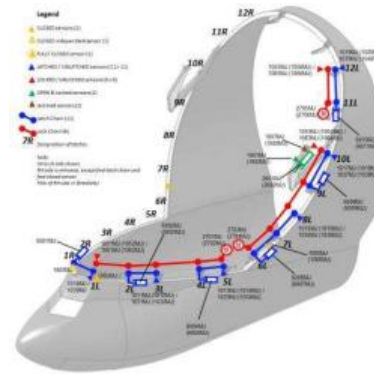
# From an A330 to a BelugaXL



# From an A330 to a BelugaXL



Design in Full 3D of the junction between A330 and new upper fuselage



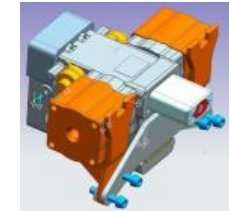
Main cargo door and cargo loading system concepts similar to Beluga ST designed for compatibility with existing infrastructures

**BELUGAXL**

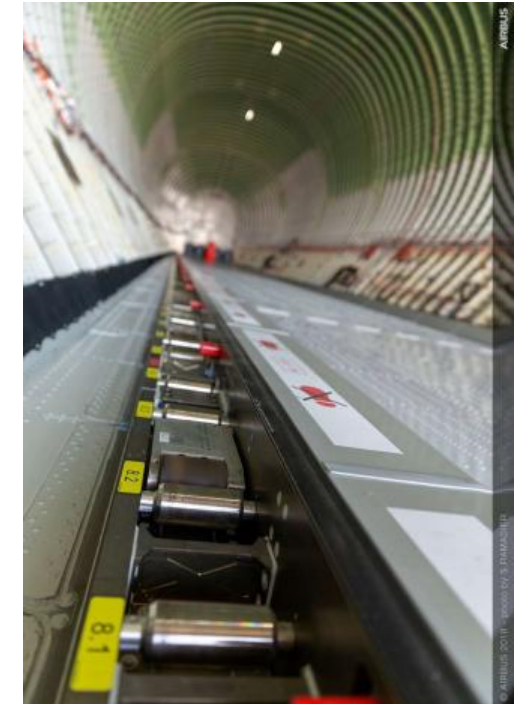
**Power Drive Unit**



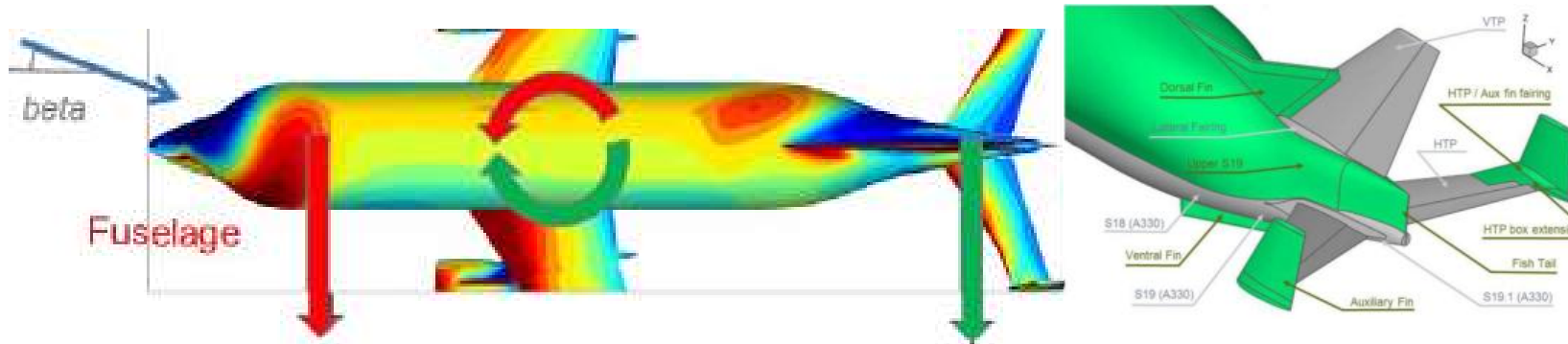
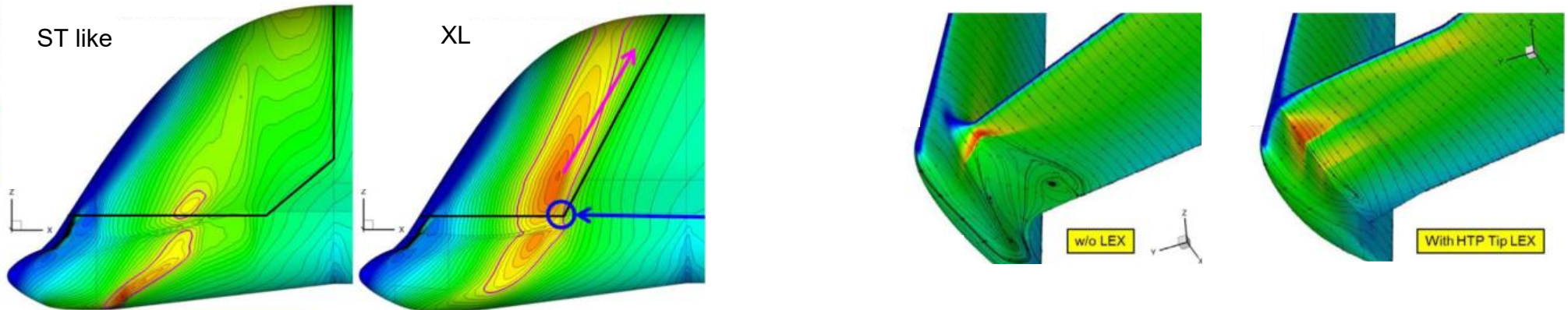
**Power Lock Unit**



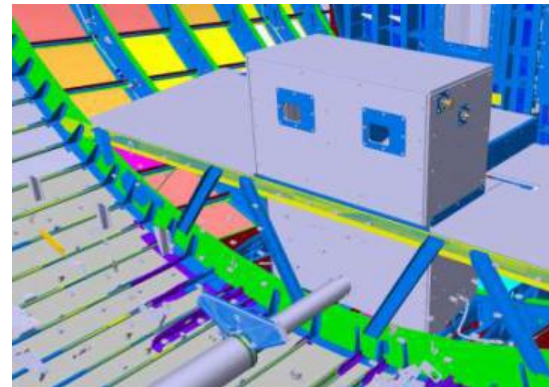
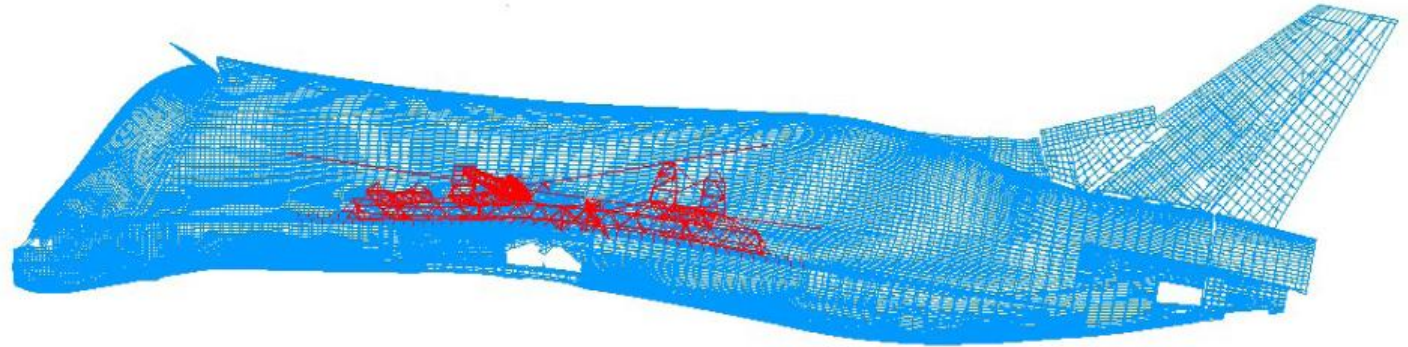
**TCU Sensor**



# Challenges: configuration



# Challenges: structure



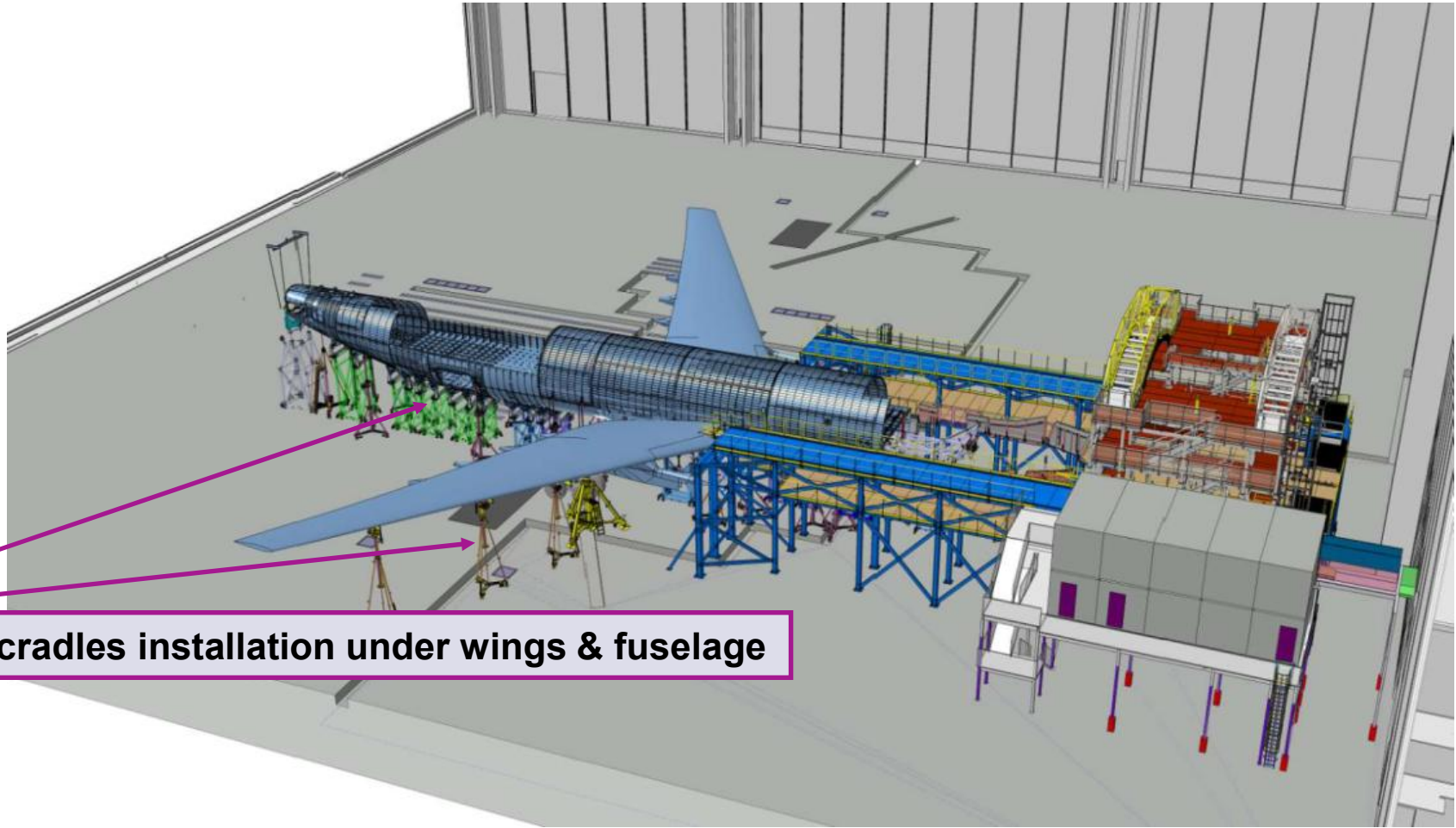
End 2016, the A330 platform is ready for 1 year of integration



## FAL assembly build process - moulding operations



## FAL assembly build process - jacking operations



Jacks & cradles installation under wings & fuselage



# 16<sup>th</sup> of Jan 2017: housewarming party of conversion hangar



© AIRBUS S.A.S. 2017 - photo by H. GOUSSÉ / master films

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## Cutting of A330 upper fuselage



## Preparation of the Junction, Installation of rails

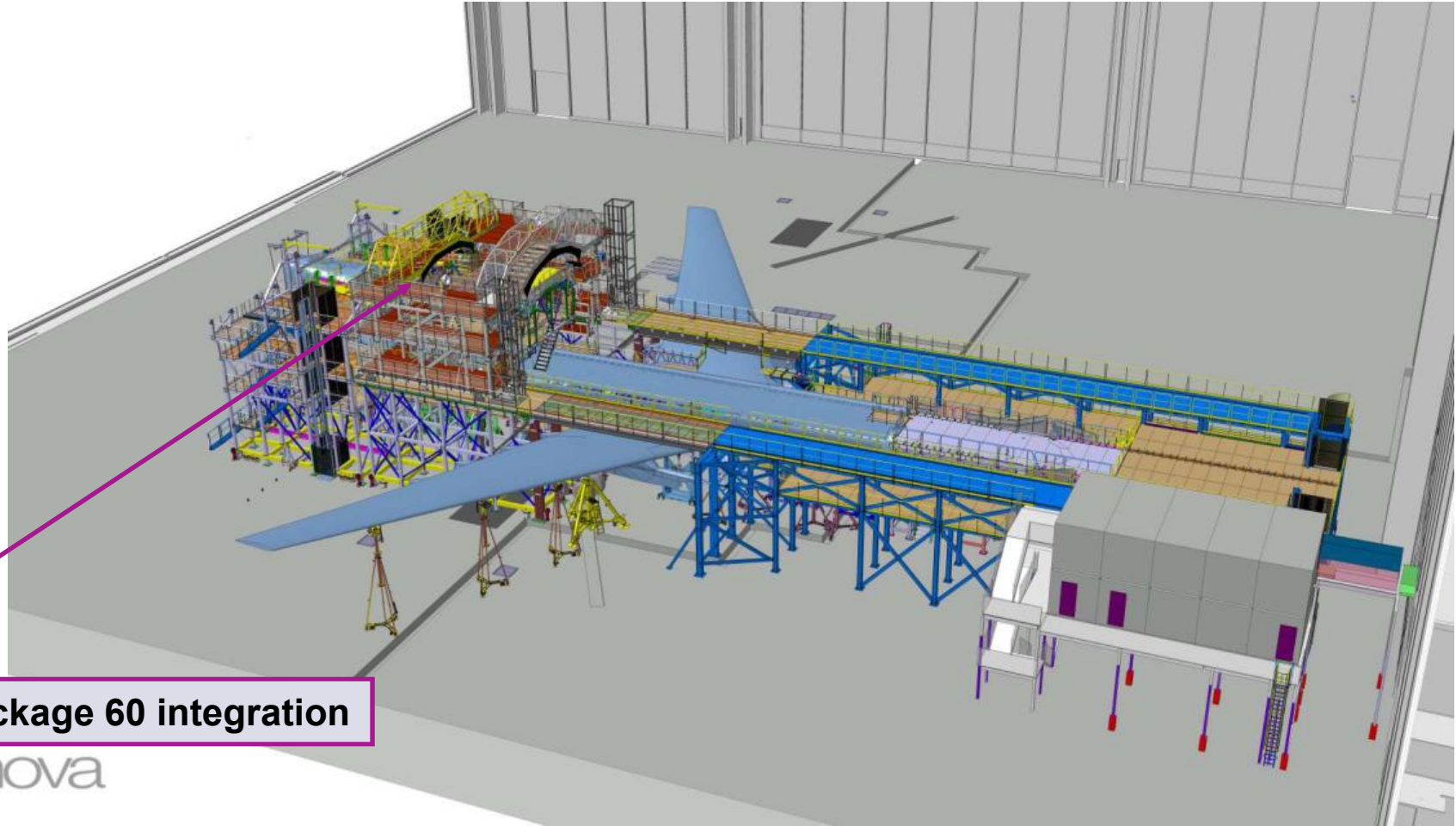


# FAL assembly build process – Fin Insert integration on Section 19



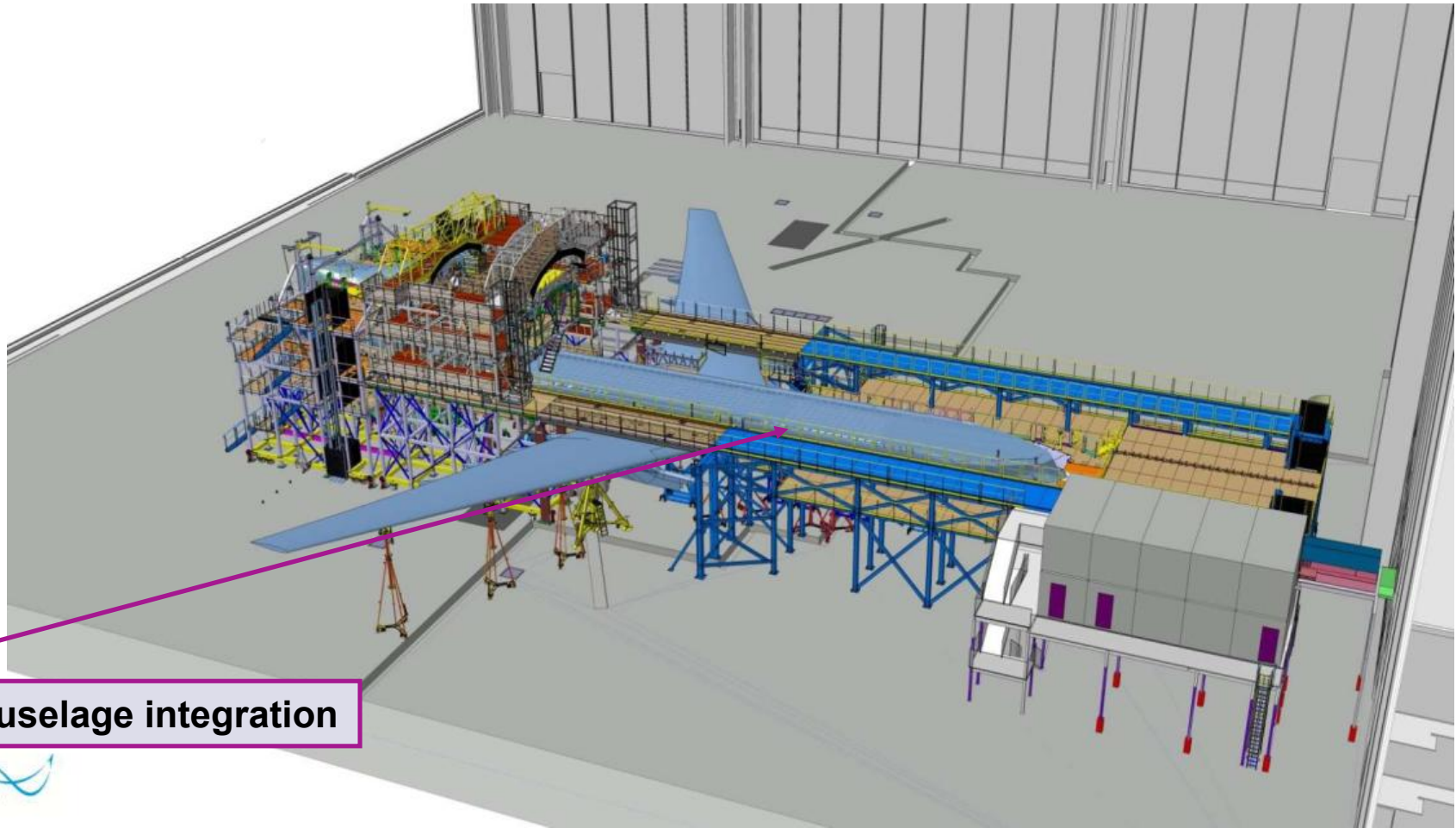
**WP70 integration on the top of Section 19**

# FAL assembly build process – Rear Fuselage integration



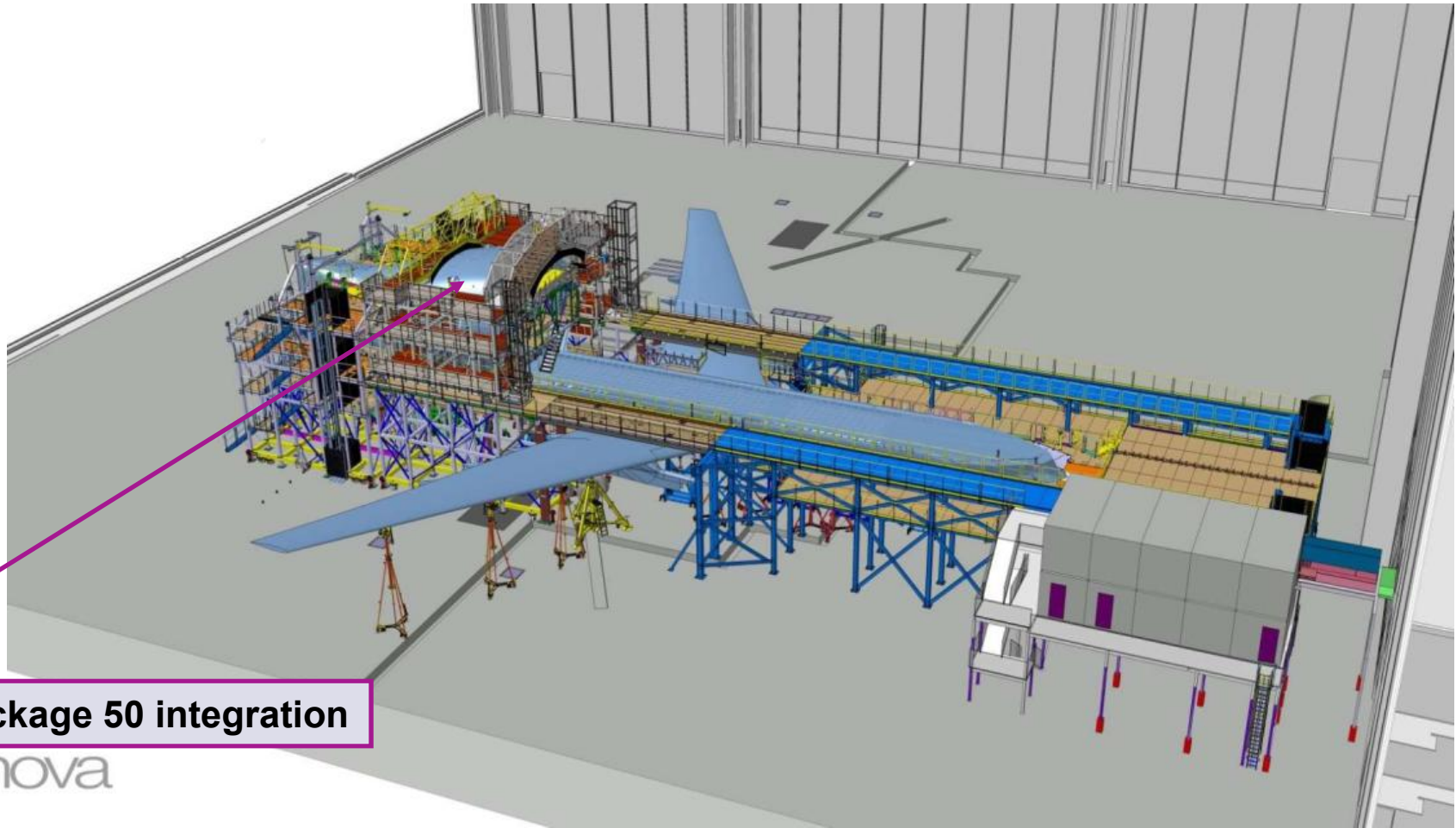
Work Package 60 integration

# FAL assembly build process – New Nose Fuselage integration



Nose Fuselage integration

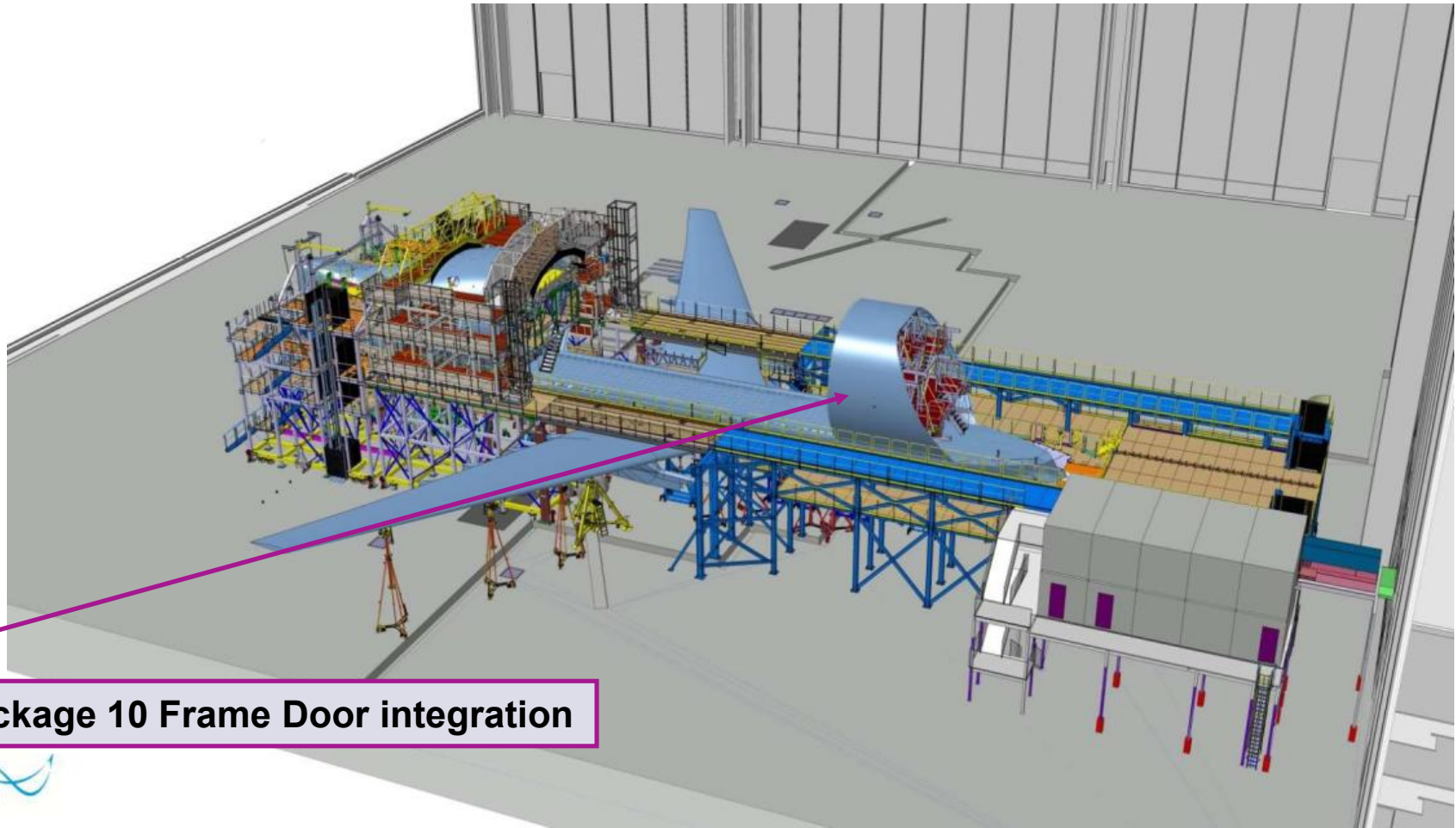
# FAL assembly build process – Rear Fuselage integration



Work Package 50 integration

AERnova

# FAL assembly build process – Door Frame integration

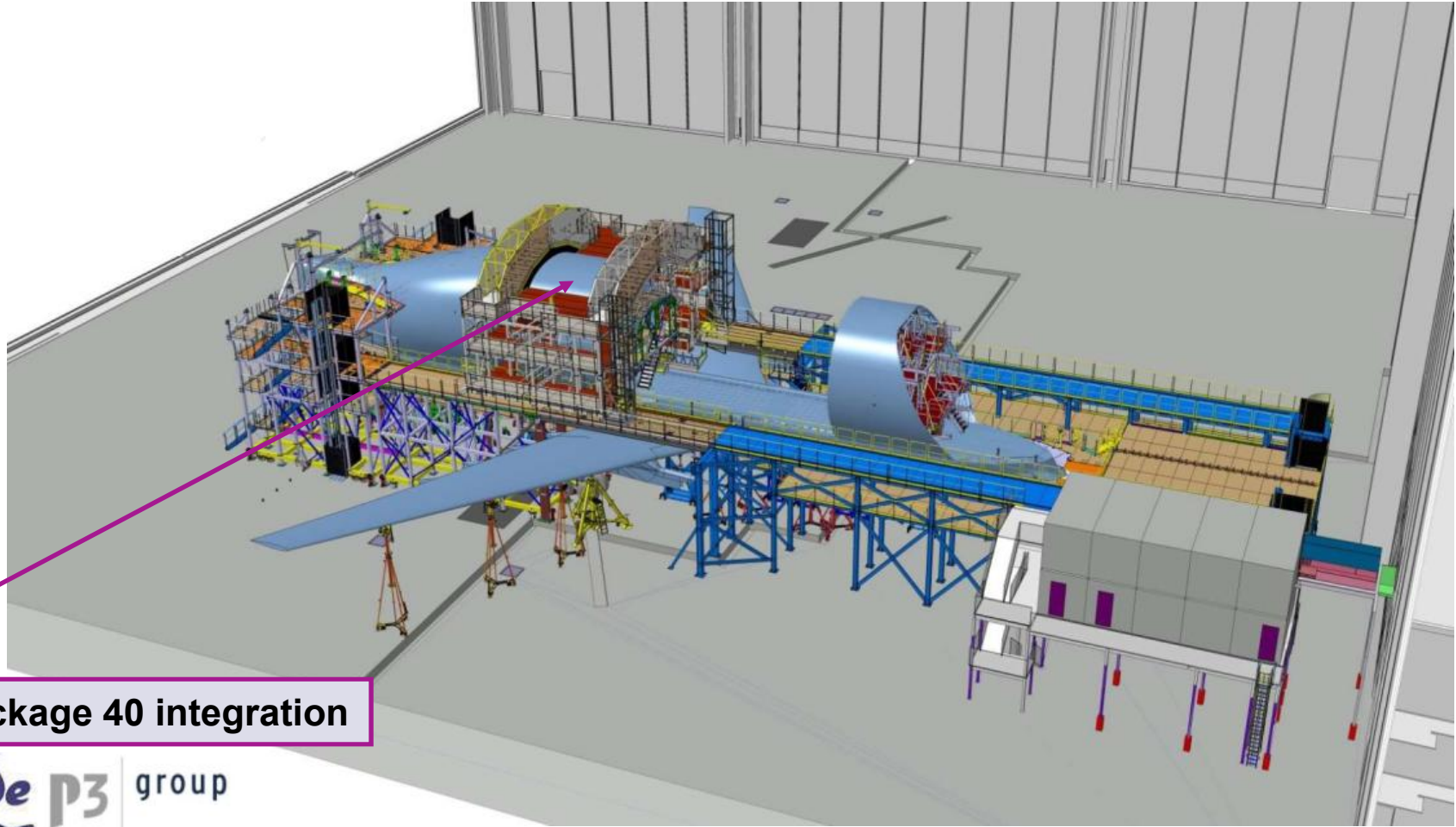


Work Package 10 Frame Door integration



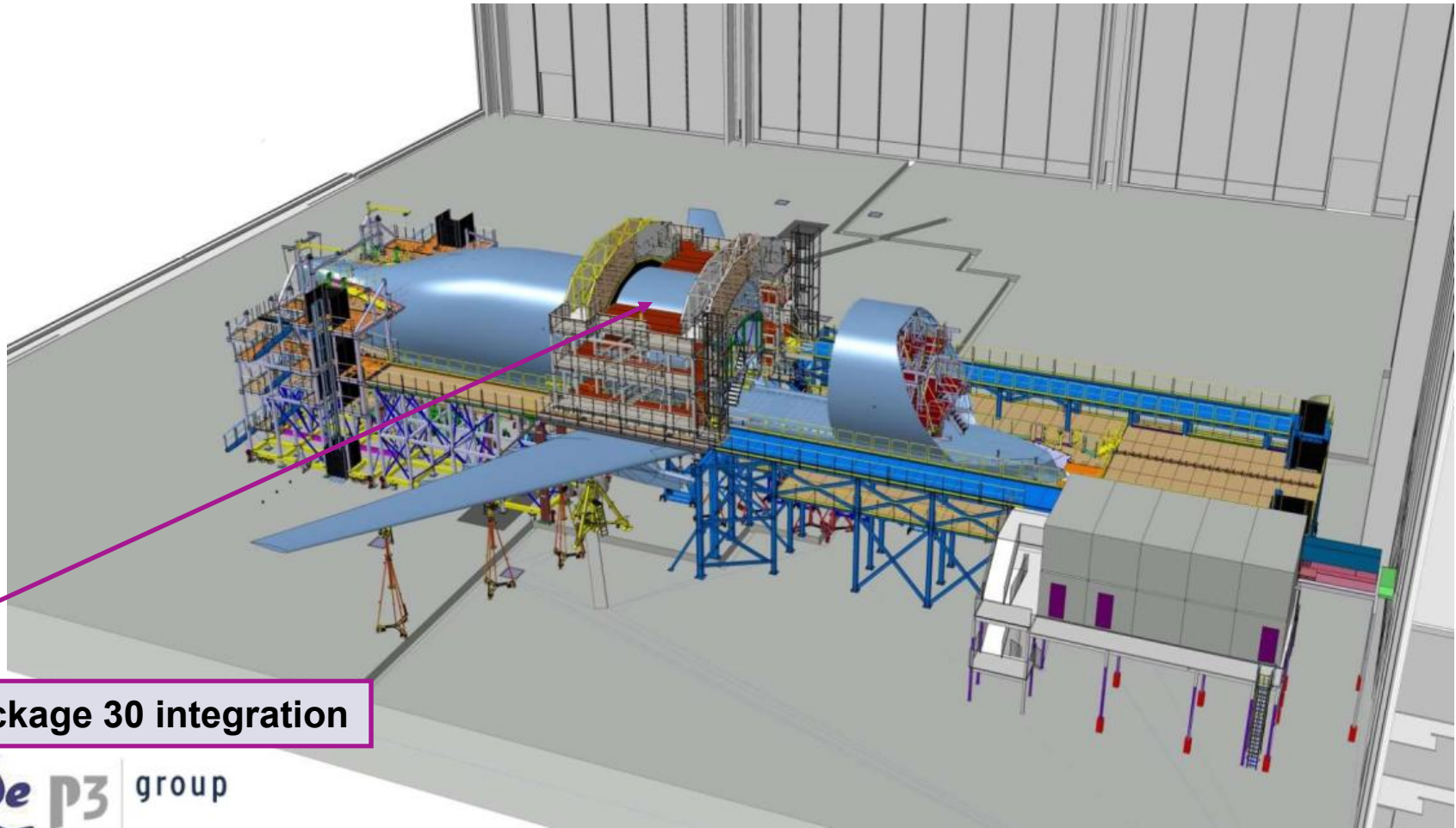


# FAL assembly build process – Central Fuselage integration



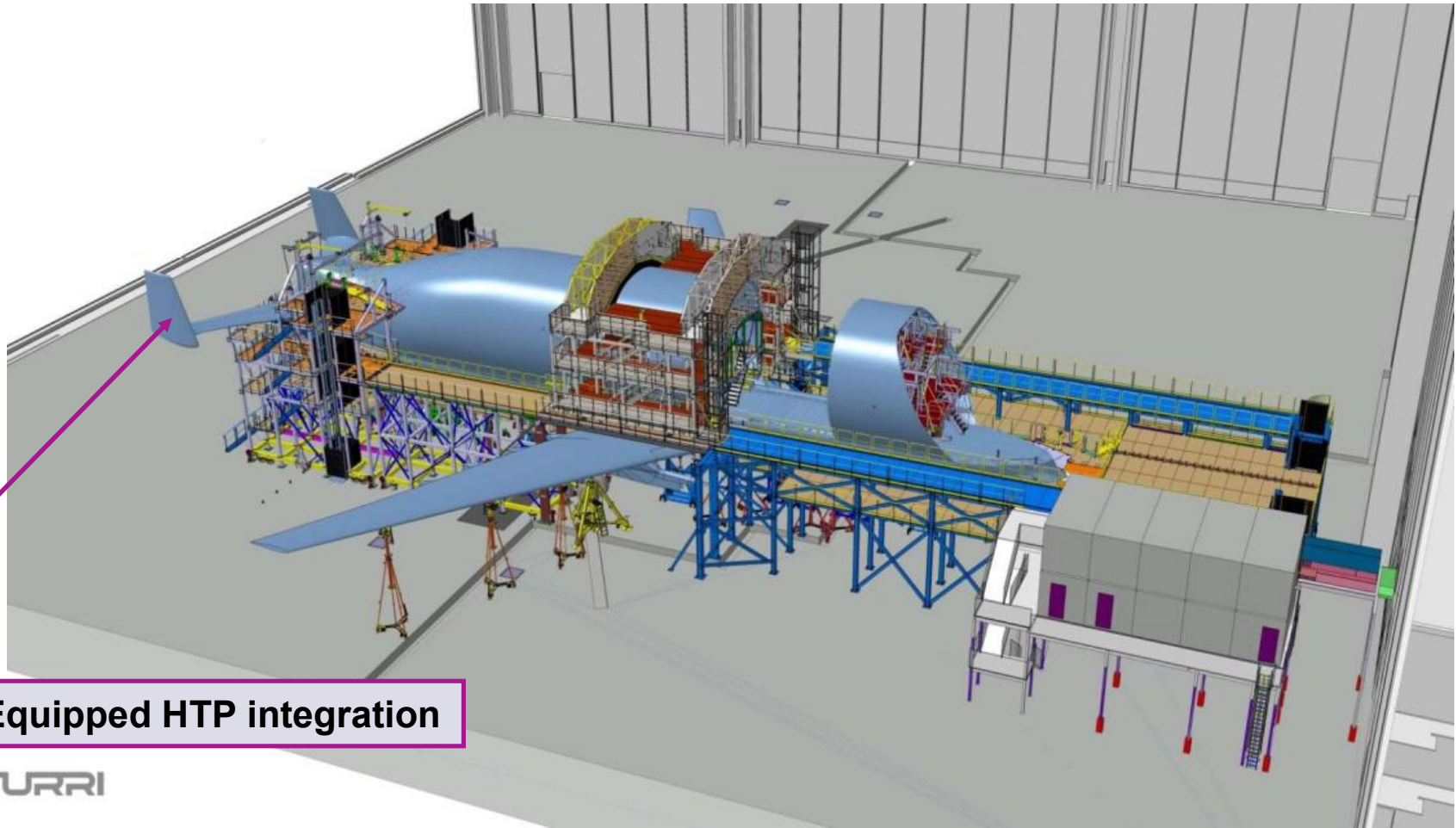
Work Package 40 integration

# FAL assembly build process – Central Fuselage integration



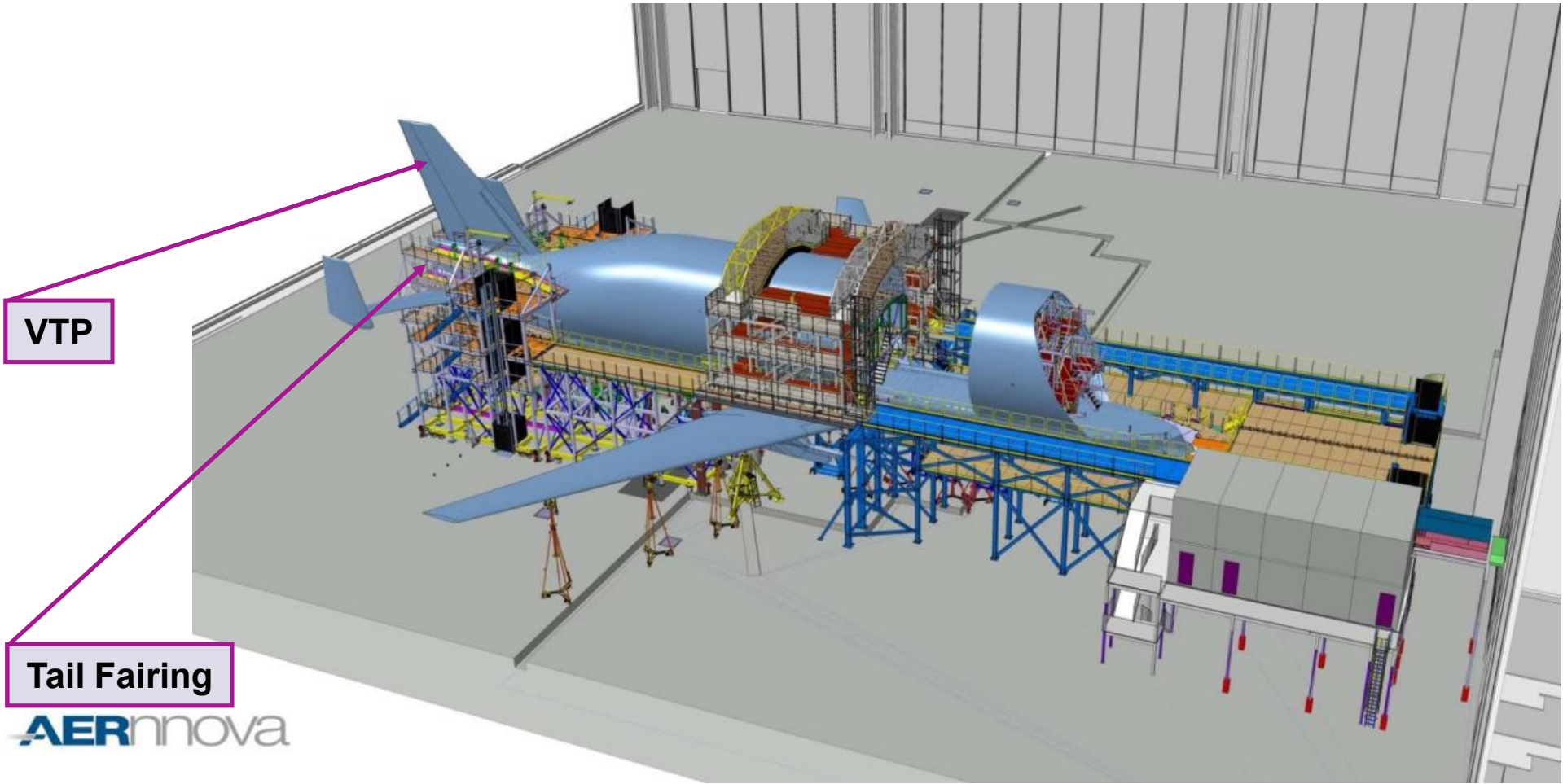
Work Package 30 integration

# FAL assembly build process – Equipped HTP integration



WP 230 Equipped HTP integration

# FAL assembly build process – Tail Fairing & VTP

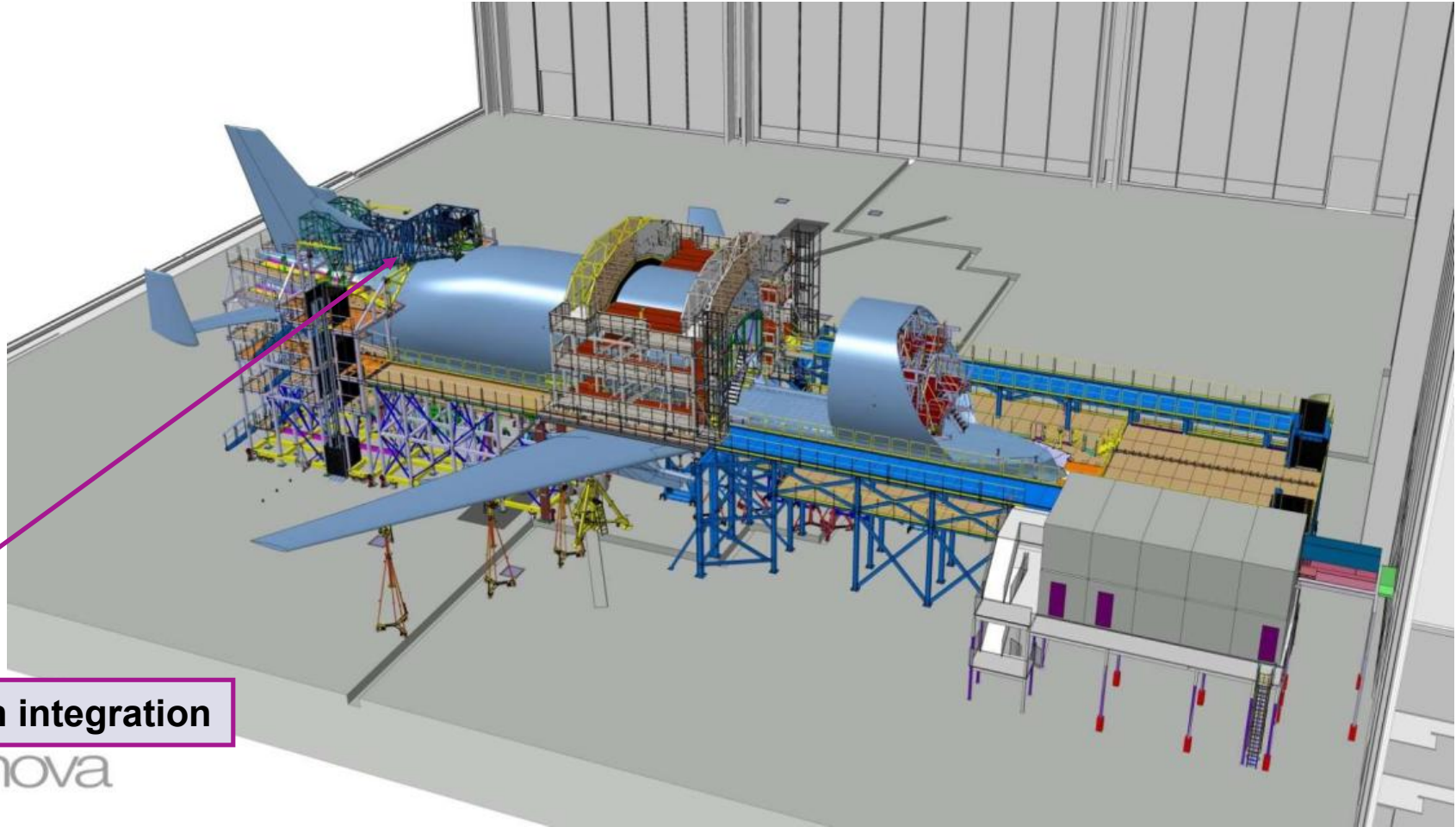


VTP

Tail Fairing

AERnova

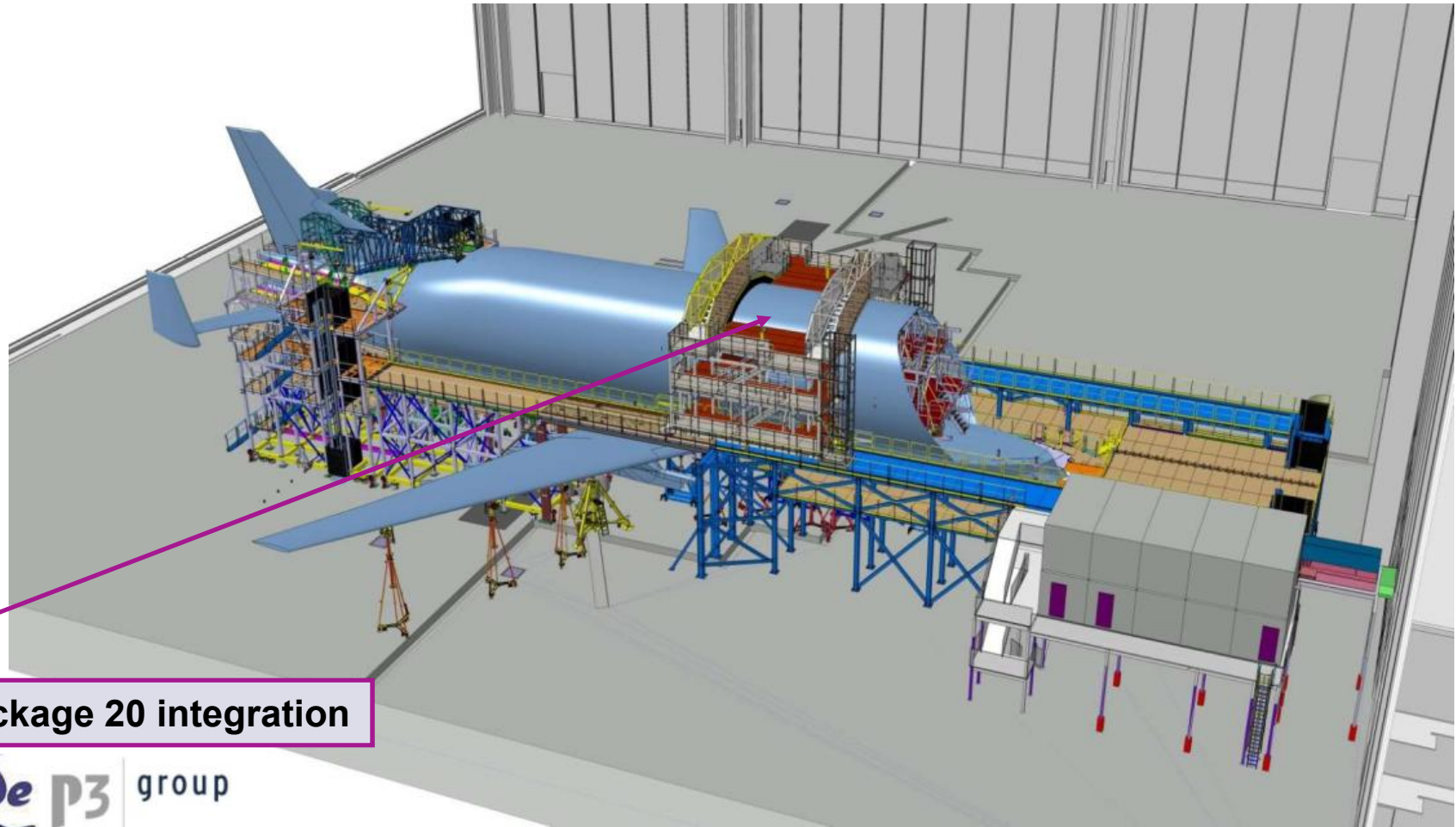
# FAL assembly build process - Dorsal fin integration



Dorsal fin integration

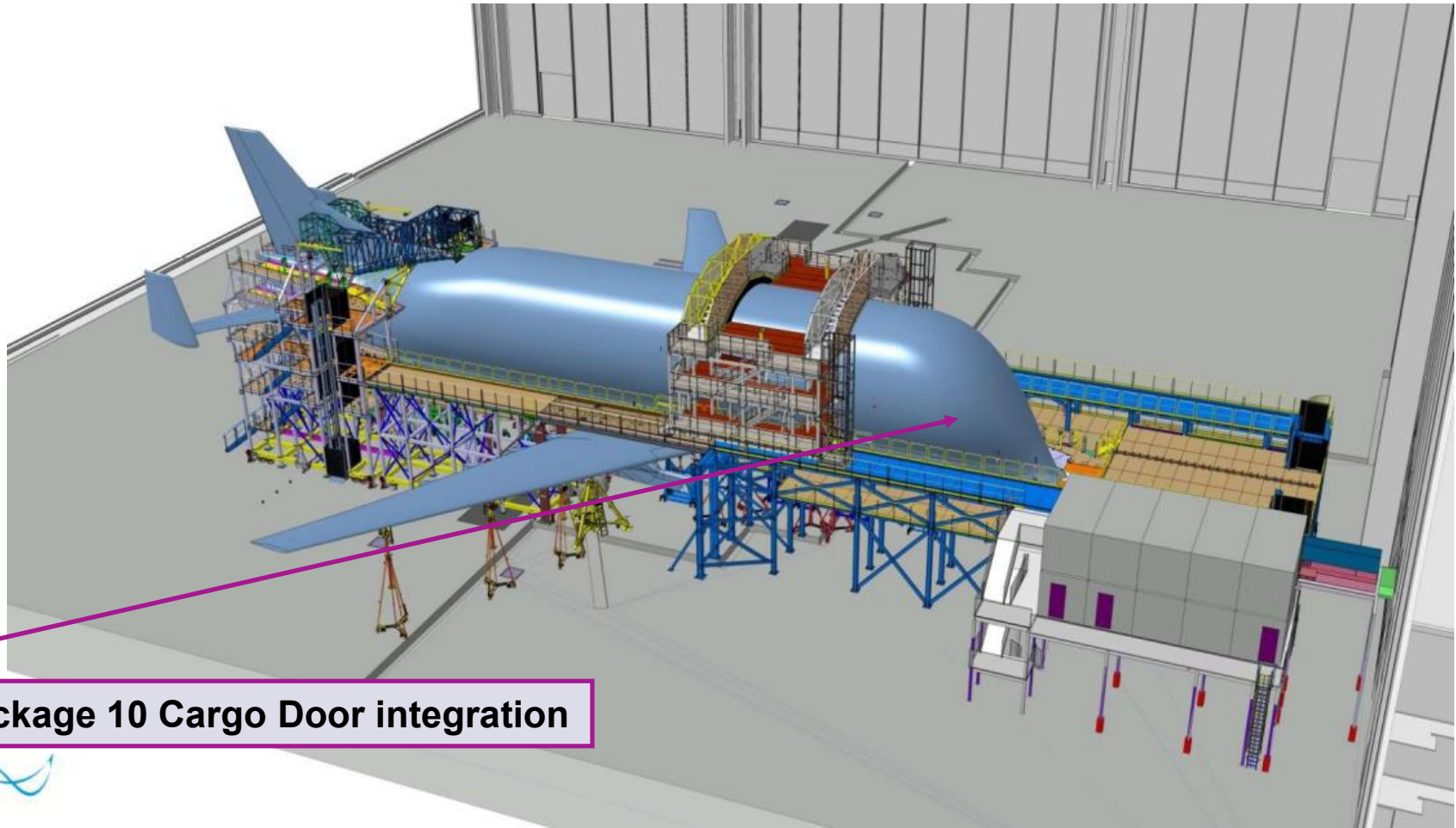
AERnova

# FAL assembly build process – Last fuselage section integration



Work Package 20 integration

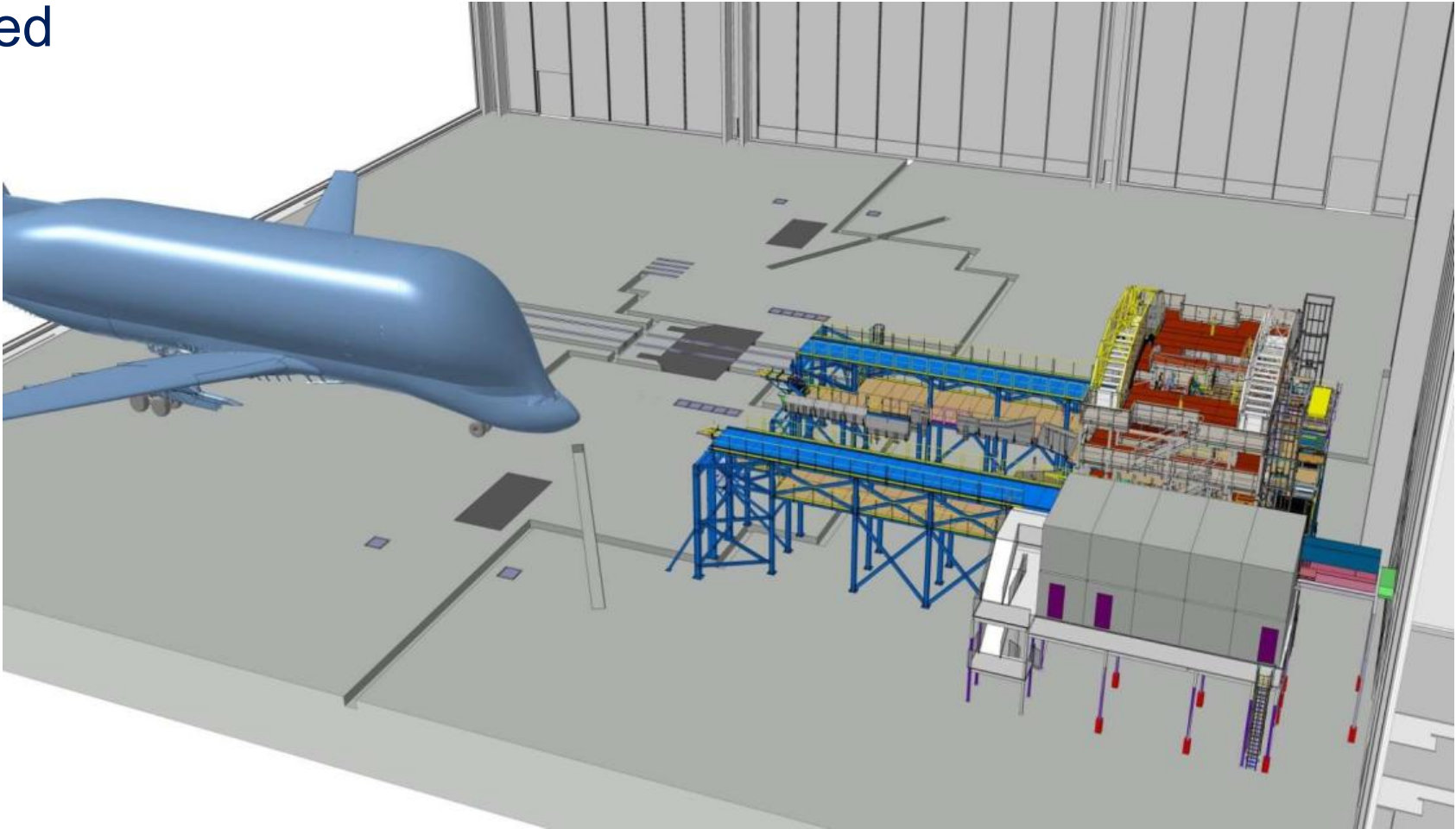
# FAL assembly build process – Main Deck Cargo Door integration



**Work Package 10 Cargo Door integration**

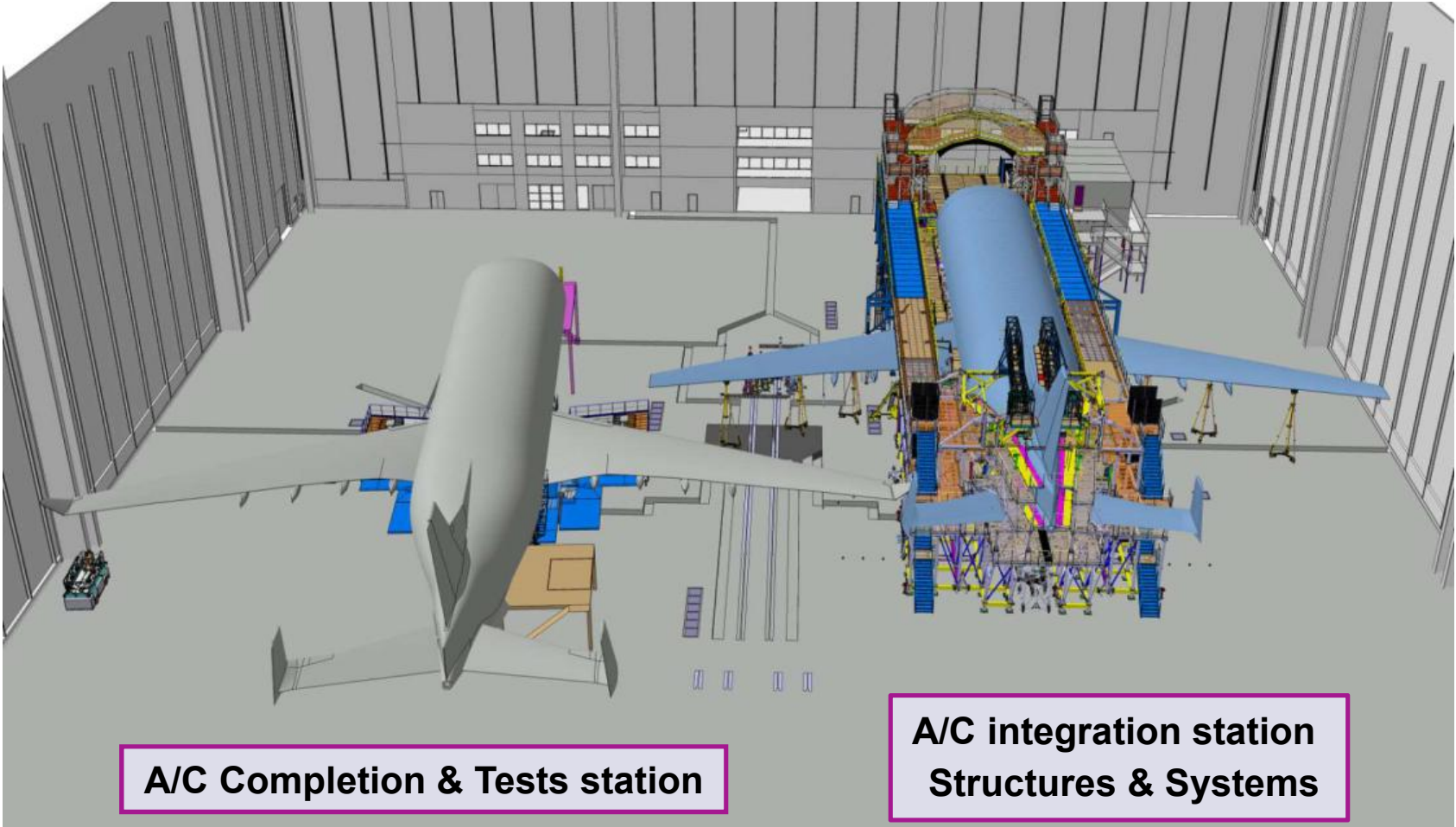


FAL assembly build process – A/C on wheels, all platforms & accesses removed





## FAL assembly build process - Stations organisation



# January 2018 - Aircraft moves



# End 2017/ Beg 2018: A/C 1 Power On & Roll out



## Dedicated Aircraft 1 testing prior First Flight: aircraft weighing



# Dedicated Aircraft 1 testing prior First Flight: GFEM validation



# Dedicated Aircraft 1 testing prior First Flight: Ground Vibration Tests



## Dedicated Aircraft 1 testing prior First Flight: Cargo Loading Trials



## 2 weeks of painting end of June 2018





# 19<sup>th</sup> of July 2018: First Flight

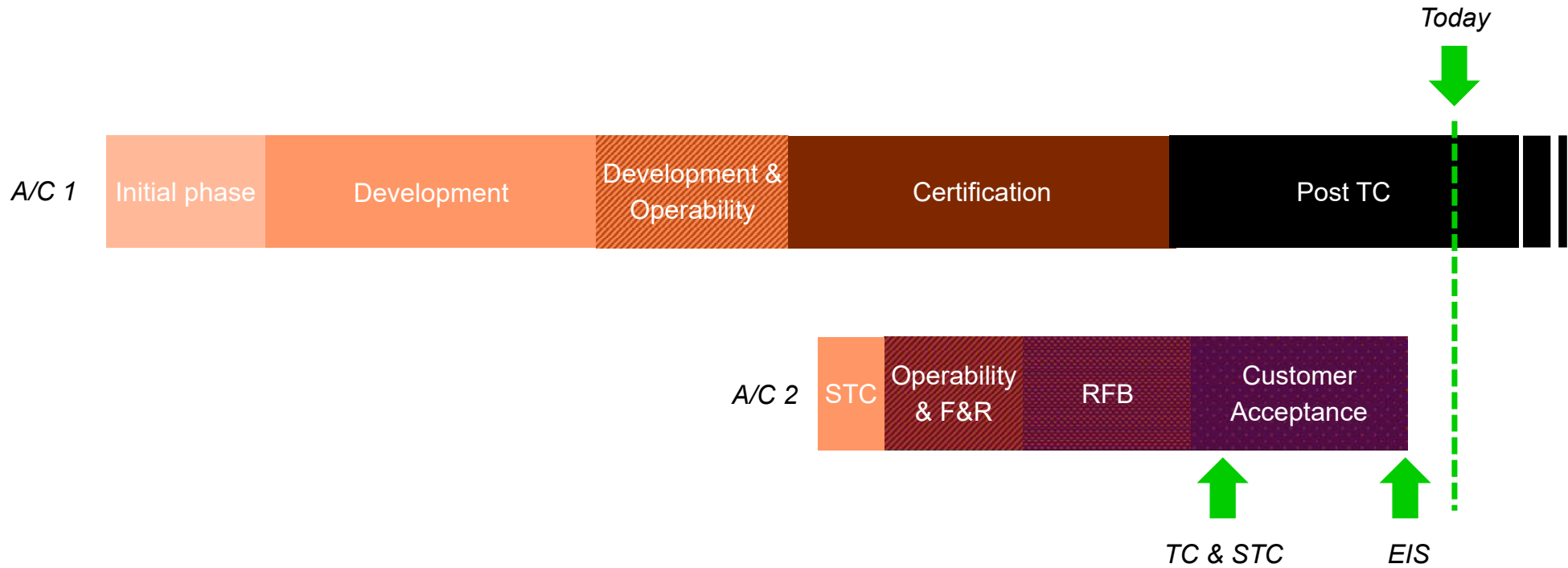




## Flight Test Installation: some particularities



# Flight Test campaign towards certification S2 19



# TC & STC on 11th of November 2019

**EASA**  
European Aviation Safety Agency

**TYPE CERTIFICATE**  
**EASA.A.004**

This certificate is issued by the European Union Aviation Safety Agency (EASA) in accordance with Regulation (EU) 2018/1139, in particular Article 17 (1) (a) thereof and Commission Regulation (EU) No. 748/2012 to

**AIRBUS S.A.S.**  
3 MOND-POINT EMILE DOWATINE  
31700 BLANZAC  
FRANCE

and certifies that the product type design listed below complies with the applicable Type Certification Basis and, if applicable, environmental protection requirements when operated within the conditions and limitations specified in the associated Type Certificate Data Sheet Number: EASA.A.004

**Type Design: A330**

Model	Initial Certification Date*
A330-300	01 October 2002
A330-300	03 March 1998
A330-300	18 November 2001
A330-300	12 July 1988
A330-300	09 April 2003
A330-300	22 October 1983
A330-300	17 May 2004
A330-300	02 June 1984
A330-300	02 June 1984
A330-300	02 April 1980
A330-300	22 December 1984
A330-300	22 December 1974
A330-300	13 November 1996
A330-300	19 September 2008
A330-300	25 September 2008

\*Not applicable to a product for which a type certificate was issued before 18 September 2009 for a EASA Member State, the initial certification date is the date of approval of the type design certificate of the product by the competent authority of the State.

For the European Union Aviation Safety Agency  
Cologne, Germany, 11 November 2019

*Rachel Dauschler*  
Rachel DAUSCHLER  
Acting Certification Director

TIN: 201912245 - 20221449 - 099001111 - 00000  
15.001.00000.000 - EASA Form Part 21 (Rev. 15.03.2018) - Page 1 of 1

**EASA**  
European Aviation Safety Agency

**MAJOR CHANGE APPROVAL**  
**10071604**

This Certificate/Approval is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 118 of that Regulation and in accordance with Commission Regulation (EU) No. 748/2012 to

**AIRBUS S.A.S.**  
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31700 BLANZAC  
FRANCE

and certifies that the change in the type design for the product listed below with the limitations and conditions specified meets the applicable Type Certification Basis and, if applicable, environmental protection requirements when operated within the conditions and limitations specified below:

**Type Certificate Number: EASA.A.004**  
**Type Certificate Holder: AIRBUS S.A.S.**  
**Type: A330**  
**Model: A330-300**

**Description of Design Change:**  
A330-300 - Bridge II  
The A330-300, Beluga XL is a derivative aircraft of the Airbus A330-300 (weight variant 180T G2). The aircraft's main mission is to carry a large aircraft assembly to support Airbus Group Corporate Team of Business' Trip assembly line and to replace in the future the current Airbus A300-600ST Beluga XL.  
Compared with the Airbus A330-300 from which it derives, the typical A330-300 XL design features are:  
- Fuselage modifications: revision of a bulkhead in the upper part of the fuselage, which provides a volumetric non-pressurized Main Deck Cargo Compartment (MDC3) including a large loading system (CLS).  
- Installation of a Main Deck Cargo Door (MDCD) and a Belly Access Door integrating a Storable stair.  
- Optional Tail Plane (TP) modified for addition of auxiliary lift fins with associated fairings and wing-edge extensions, with a reinforced structure. The vertical Tail Plane (VTP) is revised and a forward span (aircraft), a fuselage and structural reinforcements are added.  
- Limiting the cockpit and modification of an optional engine area.

See Continuation Sheet(s)

For the European Union Aviation Safety Agency  
Cologne, Germany, 11 November 2019

*Carly O'Neil*  
Carly O'NEIL  
Special Approvals & Projects

TIN: 201912245 - 20221449 - 099001111 - 00000  
15.001.00000.000 - EASA Form Part 21 (Rev. 15.03.2018) - Page 1 of 1

**EASA**  
European Aviation Safety Agency

**SUPPLEMENTAL TYPE CERTIFICATE**  
**10071622**

This Certificate/Approval is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 118 of that Regulation and in accordance with Commission Regulation (EU) No. 748/2012 to

**AIRBUS S.A.S.**  
3 MOND-POINT EMILE DOWATINE  
31700 BLANZAC  
FRANCE

and certifies that the change in the type design for the product listed below with the limitations and conditions specified meets the applicable Type Certification Basis and, if applicable, environmental protection requirements when operated within the conditions and limitations specified below:

**Type Certificate Number: EASA.A.004**  
**Type Certificate Holder: AIRBUS S.A.S.**  
**Type: A330**  
**Model: A330-300**

**Description of Design Change:**  
Airbus Interiors Version (AV) (AOC C1295) due to new installation on Airbus A330-300 (Beluga XL).  
This Cover Area MOD C1295 provides a module integrated in the A330-300 Beluga XL aircraft, between the design and the approved bulkhead. This module provides transportation processes up to four occupants. The STC MOD C1295 is associated to the initial configuration definition of the A330-300 Beluga XL aircraft, as defined in Airbus A330-300 Type Design Services (TDS) 00000004143000 as issue 8.

**EASA Certification Basis:**  
This Certificate Basis for the original product is amended by the following additional or alternative airworthiness requirements:  
Special Conditions: 0-62-700; (Cabin Area, Allowed Occupants); 0-63-700; (Emergency Evacuation); D-30-700; (45 Counter Area airworthiness requirements for low altitude aircraft).

See Continuation Sheet(s)

For the European Union Aviation Safety Agency  
Cologne, Germany, 11 November 2019

*Carly O'Neil*  
Carly O'NEIL  
Special Approvals & Projects

TIN: 201912245 - 20221449 - 099001111 - 00000  
15.001.00000.000 - EASA Form Part 21 (Rev. 15.03.2018) - Page 1 of 1

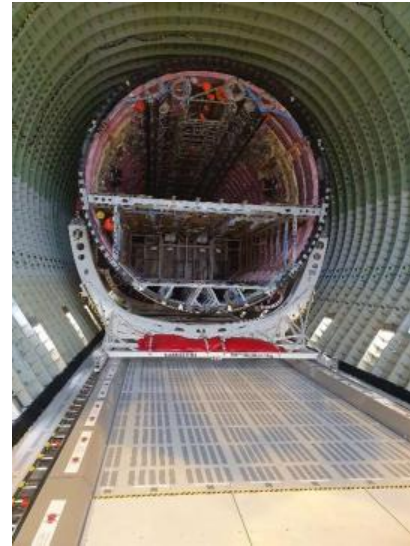
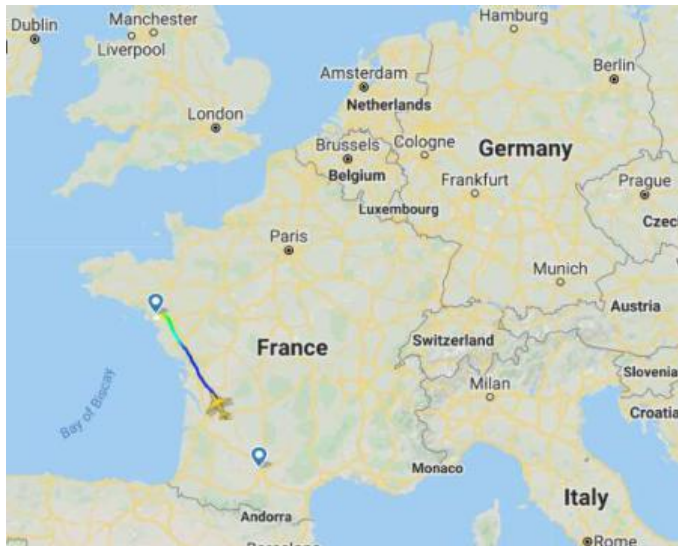
AIRCRAFT STATEMENT OF CONFORMITY			
1. State of manufacture	1. EASA		3. Statement Ref. No.
	EASA		T 8208
4. Organization	AIRBUS Operations S.A.S. - 10 rue Eugène Bie, Avenue Jean Monnet - 31770 Colomiers, FRANCE		
5. Aircraft Type	A330-300	6. Type certificate Ref.:	EASA.A.004
		DATE:	15-Nov-2019
7. Aircraft Registration or Mark	F-GZLN	8. Manufacturer Identification N°	1853
9. Engine/Propeller Details (*)	Manufacturer: ROLLS ROYCE	Engine model:	TRENT700-60
	Position 1: 4300	Position 2:	4307
10. Modifications and/or Service Bulletins (*)	See Aircraft Inspection Report - Chapter 4		
11. Airworthiness Directives	See document ref. N° L1810380		
12. Concessions	See Aircraft Inspection Report - Chapter A and B		
13. Exemptions, Waivers or Derogations (**)	As per Airbus Letter 1810000008_02 dated Dec 4th 2018, Airbus has requested a waiver to cover the mix configuration between the Modifications 2005F and 3005F. The 18100183 is required therefore with a 01-01-03 door PIN F32E1001117 and a L1-01-03 door PIN F32E1001118 which constitutes deviation to the A330-300 type design definition. This waiver has been accepted by EASA Letter - AERB_181000_05.10.2019. The aircraft complies with the EASA TCDS A.004 of the latest applicable revision, except only for the partial endorsement listed above and to its condition for safe operation.		
14. Remarks	Accounted etc. 10071622	First Flight Date:	15-Apr-2019
15. Certificate of Airworthiness	Certificate of Airworthiness		
16. Additional Requirements	None		
17. Statement of Conformity	It is hereby certified that this aircraft conforms fully to the type-certificated design and to the terms above in boxes 5, 10, 11, 12 and 13. The aircraft is in a condition for safe operation. The aircraft has been satisfactorily tested in flight.		
18. Signat	<i>Cl. Naudy</i>	18. Name	CL. NAUDY
		19. Date (DD/MM)	05-Dec-2019
21. Production Organisation Approval Reference	EASA-210-0001		

# Delivery on 6th of December 2019

# Adaptation of the overall system in parallel



In operation since the 9th of January 2020, in SNZ on 16th of January **BELUGAXL**

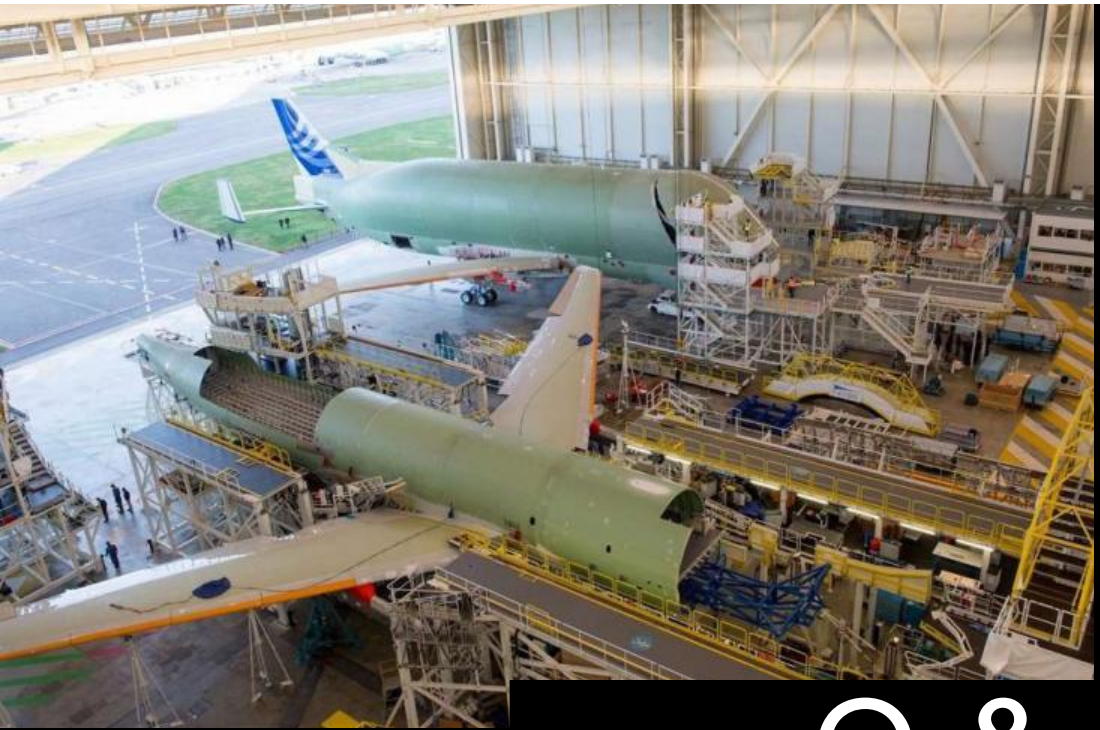


**AIRBUS**









# Q & A



**Thank you**

**AIRBUS**